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ENVIRONMENTAL CONSIDERATIONS FOR SELF-RELIANT ECONOMIC DEVELOPMENT IN AFRICA

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Summary

The paper entitled "Environmental considerations for self-reliant economic development in Africa" surveys the environmental dimensions of development activities in developing countries within the framework of problems relating to environmental protection, conservation and rehabilitation. The point is made that for Africa to make appreciable progress in socio-economic development during the next United Nations Development Decade, African countries must embark on eco-development by applying environmentally sound, ecological principles to their development plans, policies, goals and programming.

In reply to pertinent questions as to whether it is necessary to examine the environmental dimensions of economic development activities for possible deleterious effects, a survey was made of studies on the economic evaluation of development projects by cost-benefit analysis and on the preparation of guidelines for assessing environmental impacts.

A review of current activities on the African continent to combat environmental problems at all levels has also been undertaken. As a result, African Governments are requested, through an action plan, to initiate policies, institutions and programming activities for an integrated environment-development approach to combat priority problems of national concern.

A. INTRODUCTION

1. Although concern for environmental problems predated the Stockholm Conference of 1972, the increase in activities in this area can conveniently be attributed to the Conference and the consequent establishment of the United Nations Environment Programme (UNEP) in the same year. Since then, African Governments have become more and more aware of the environmental dimensions of socio-economic development. In recent years, the concept of environmentally-sound development has consciously entered into the thinking on, and actions for the socio-economic transformation of the economies of the continent. Yet, there are still problems and doubts about the relationship of environmental issues to development and economic growth. Indeed, the problem of successfully convincing African planners, policy makers and managers as well as the general public about the seriousness of the dimensions of environmental problems through environmental education remains to be solved. Progress will involve a reorientation of thinking towards the concept of environmentally sound development as a global goal in the same light as the concepts of human rights and individual freedoms which are acknowledged by most countries in the world today. Both concepts regulate human activities for a better quality of life in the biosphere and for the improvement of the standard of living and society.

2. In the controversy surrounding this issue, the following questions are usually posed: (i) what is the role of environmental issues in self-reliant and self-sustainable development? (ii) is it really necessary to consider environmental dimensions in socio-economic development activities? (iii) is it worthwhile to assess the possible deleterious effects of the development process on the environment and vice versa? and (iv) are environmental considerations compatible with the rapid economic growth which is badly needed to reduce the scourge of widespread and mass poverty on the African continent? These are genuine questions that must be answered, but the answers hinge very seriously on the purpose of development and on whether or not it is necessary to sustain any form of development once it is initiated.

3. It is now generally agreed that the ultimate purpose of development is the improvement of the natural environment for the benefit of mankind and for the well-being of all the people in a country. In effect, what is required is the positive results of development less the costs of any deleterious effects. This means that the quality of life is of greater concern than just the provision of goods and services whose production usually results in unpleasant side effects causing water and air pollution, environmental degradation and so on, to which scant attention has been paid until recently. With respect to sustainability, there is no doubt that once an acceptable standard of living is achieved, people would want to sustain it. Yet, in pursuing development activities little attention is paid to the effects of inappropriate technologies that would destroy soil structure in agricultural practice or increase water-borne diseases in an irrigation water dam project. There is also a tendency to neglect the problems of deforestation that would

reduce prospects for future generations and even those of desertification that threaten the existence of the present generation. Therefore, in the light of the development objectives and goals that African Governments have adopted, they cannot afford not to pay attention to environmental problems.

4. Since the issue of the relationship between environment and development came to the forefront in the early 1970s, a lot had been written about the environmental problems of the developing countries. As a result of the early practice of reviewing and evaluating investment projects from the standpoint of their potential effects on the environment, the World Bank was able to point out that the environmental problems of developing countries can be categorized into two groups:

(a) Those arising from the effects of poverty shown on the bio-physical environment through long years of mismanagement (soil erosion, denuded forests, over-grazing) and requiring rehabilitation of the deteriorated environment; and

(b) Those arising from the effects of the development process itself on the environment as shown in agricultural growth by the use of fertilizers and pesticides, clearing of forests and irrigation problems, and also in industrialization and processing of raw materials by the release of wastes and pollutants. 1/

5. The Founex report of 1971 summarized the issues by pointing out that poor countries were more concerned with the impact of the environment on human life (as shown by poor sanitation, water, housing, nutrition and by diseases) whilst rich countries' priorities related to the impact of development on the environment. 2/ Also, the issues of poverty and of the physical aspects of environmental problems dominated the Africa regional meeting preparatory to the Stockholm Conference in 1972. In a study on the need for environmental education in Africa, 3/ it was pointed out that the developing countries were plagued by environmental problems relating to poverty because of the lack of development to provide basic necessities of life such as adequate food, clean air and water, suitable shelter, basic education and safe working conditions, good health and some leisure time.

1/ Environment and Development: World Bank, June 1975.

2/ Founex report submitted by a Panel of Experts to the United Nations Conference on the Human Environment, 4-12 June 1971, Founex, Switzerland.

3/ See N.H. Ayodele Cole, Towards solving problems of environmental stresses in developing countries, Environmental Management, Vol. 3, 1979. Spinger Verlag, New York, Inc., United States of America.

6. All points considered, it is clear that the African region's interest in and preoccupation with environmental problems can be based only on its interest in and concern for the quality of life and the sustainability of self-reliant, endogenous and self-sustaining development. This conclusion recalls an editorial article on the debate on what kind of growth for economic development, and whether concern for the environment was an asset or a stumbling block to growth, where it was pointed out that besides sustainability and adaptability for proper growth incentive, conviviality was another consideration. The editor went further to say, "The way people treat each other and the way they treat the environment are closely related. A convivial society - one in which the identity and autonomy of other people, of whatever sex, race, culture, social class or educational standard, are respected -- will also be a society which respects its natural environment". 4/ This statement indicates the close relationship between respect for human rights and respect for the environment. Those who can afford to neglect either concept (that is, basic human rights or environmentally-sound development) will find out that even though physical development of the natural environment may show visible and tangible progress, yet socio-cultural and political systems will leave much to be desired as far as the satisfaction of basic human needs and welfare are concerned.

7. If "environment" is taken to mean "the total setting for economic development activity", i.e. to both the naturally occurring milieu (in which ecological systems operate to control the relationship between man and other living things and their environment) and the socio-cultural milieu which man has created to adapt to the demands and challenges of his naturally occurring surroundings, 5/ then the questions of widespread poverty and external relations are also important. In this connexion, all existing talks about equitable distribution of income and other fruits of development, popular participation, acquisition of skills, etc., are meant to deal with the problem of mass poverty. Similarly, on-going talks and negotiations in international fora are meant to deal with the need for creating a favourable external environment for the development of the developing countries. Therefore the main concern in this paper is with the physical aspects of environmental problems.

8. The paper is divided into three parts: namely, environmental dimensions of development activities in Africa; incorporation of environmental issues in development analysis and planning - the role of techniques of cost-benefit analysis; and conclusions and proposed action plan for environmental considerations in African development.

4/ See, Andras Biro, what kind of growth in Mazingira: No. 3/4 The growth-environment dilemma, Andras Biro (ed), UNEP, Nairobi, 1977.

5/ See Environment and Development, World Bank, June 1975.

B. ENVIRONMENTAL DIMENSIONS OF DEVELOPMENT ACTIVITIES IN AFRICA

9. The environmental dimensions of socio-economic development activities generally encompass three major spheres of interest which are discussed below with particular reference to the African situation:

(a) Environmental protection of the air, water, land, soil, seas and food from pollutants, contaminants and toxic chemicals resulting from industrial, agricultural and domestic wastes;

(b) Environmental conservation of natural resources -- forests, soils, wild life, energy, minerals, water, rangeland, marine and human -- for wise use and preservation for future generations; and

(c) Environmental rehabilitation to restore ecological equilibrium to degraded ecosystems resulting from deforestation, desertification, soil deterioration, marine pollution, [illegible] pollution from various sources and natural disasters.

Whilst environmental protection and conservation management are preventive measures, environmental rehabilitation is a curative measure. In terms of environmental cost-benefit effects the old adage in medicine holds true also for environmental matters, i.e. "prevention is better than cure".

Environmental protection

10. The main components of the environment which need protection are the atmosphere on which living things depend for respiratory and other gases and the t[illegible]ial, marine and aquatic ecosystems that form the habitats in which they live. Protection involves measures to prevent or control the entry of noxious and toxic chemical pollutants, contaminants and non-biodegradable materials into the living biosphere. It is a well known ecological principle that the living biosphere can and does accommodate a certain amount of waste products which are readily degraded through decomposition and putrefaction involved in various ecological cycling processes such as the carbon, nitrogen, and biogeochemical (minerals) cycles. Ecological balance is maintained when the rate of waste removal equals the rate of acc[illegible] in the ecosystem. Environmental problems such as pollution are a result of a breakdown in the ecological systems when wastes accumulate much faster than the capacity of the system to eliminate waste products. Life itself becomes endangered when the natural environment cannot renew its life-supporting capabilities.

11. Although pollution problems in Africa are not yet serious, it is still necessary to point out the problems of developed countries and the environmental repercussions of the development process for Africa to digest and learn from the mistakes of others. The main cause of the breakdown of the ecological system (ecosystem) is the uncontrolled release of waste products from man's activities in the industrial, agricultural and the domestic sectors into the total environment. For example, clean air is polluted by

five main substances released into the atmosphere, namely: (i) sulphur oxides released from lead, copper and zinc smelters and from burning fossil fuels; (ii) carbon monoxide emission from automobiles and other engines; (iii) ozone and other photo-chemical oxidants formed by the action of sunlight on organic chemicals (hydrocarbons) in the presence of oxides of nitrogen in the atmosphere; (iv) nitrogen oxides released from coal-burning power plants; and (v) total suspended particulates (TSP) released as fine particles of nitrogen and sulphur compounds, industrial dusts from heavy metals, lead particles from super-petrol, asbestos and natural fugitive dust from agricultural and other soils.

12. Clean water can be polluted by biological, physical and chemical wastes. Biological pollutants are generally faecal bacteria. Physical pollution (thermal) arises from increased temperature of waste water from electricity power plants located on the coast or near rivers. Chemical pollutants arise mainly as industrial wastes with heavy metals (mercury, lead, cadmium), non-biodegradable plastics and various chemical organic (benzene) and inorganic (acids and concentrated salts) liquids. Other chemical pollutants arise from agriculture, such as fertilizers (nitrates, phosphates), herbicides and pesticides (DDT Lindane). Rivers, streams and lakes can also be polluted when clogged by domestic wastes (municipal wastes and household rubbish) eroded soil, fuel oil or other suspended or dissolved solids. The same situation can arise in coastal estuaries, in the sea and on beaches by the dumping of rubbish, municipal and industrial wastes from nearby urban areas.

13. The economic and social effects of environmental pollution are most evident in loss of human work output and at times death resulting from environmental diseases. Drinking water polluted with toxic chemicals and eating contaminated food result in poisoning and acute illness, besides other long-term chronic illness such as cancer. Air pollutants such as carbon monoxide cause heart diseases (angina pectoris) and various respiratory complications as asthma and bronchitis. Pollution also decimates livestock and wildlife through the entry of toxic chemicals into the food chain (plants -- lower animals -- higher animals -- man). Toxic chemicals in the soil (heavy metals) have adverse effects on plant growth as shown by reduced yields of grain, root crop, legumes and vegetables. Livestock yield and fishes are also adversely affected. Finally, pollution results in loss of aesthetic value which is not easily quantified in economic terms; for example, bad smell of small streams or slaughter-house areas; noise from industrial machinery, in the vicinity of airports and from night-time traffic on main roads; and unsightly landscape resulting from mining tailings, slums and unkempt open-air markets, all of which are common all over Africa.

Environmental conservation

14. The economic effects of lack of conservation and mismanagement in the use of natural resources is clearly evidenced in developed as well as in developing countries. In the former, the economy is resource-intensive for industrialization, so greater demands for raw materials are made on the developing countries

which, for want of much needed foreign exchange, are compelled to neglect conservation practices in the exploitation of natural resources. The result has been widespread loss of forests, fishes and mineral resources, to the point at which renewable resources such as forests and fishes become non-renewable as the rate of recovery fails to keep up with the rate of depletion. In many parts of Africa and in other developing areas, the rate of depletion of forests and farmbush near towns for firewood and charcoal-making is astounding, as surrounding vegetation recedes several kilometres annually away from urban areas.

15. The process of deforestation is more marked in developing countries where forest reserves and protected forests have decreased to between 4 per cent to 10 per cent of the country over the past few decades. In Africa, the forest resources per capita now stand at 1.2 acre (0.5 hectare) whilst in North America, the figure is six times better at 7 acres (2.8 hectare) per person. 6/ Three main causes of deforestation in developing countries are: (i) the farming system of shifting cultivation; (ii) firewood collection and charcoal preparation; and (iii) timber exploitation. The traditional farming system of shifting cultivation when practised on a five-to-ten-year cycle of fallowing, restores soil fertility and provides firewood for the rural population. But with increasing population density in African towns, the fallow cycle is shorter (three to four years) so the soil fails to recuperate, less firewood is obtained from regrowth and more forested area has to be cleared for agriculture in order to compensate. The result is soil deterioration and failure of the natural ecological succession of farmbush to forest regrowth and then to secondary forests. And so degraded grassland as derived savanna takes over the poor forests soil. The ultimate process of deforestation is most marked on bare, eroded hill slopes common near townships all over Africa where even the derived savanna has failed to grow as there is no more soil left for plant growth.

16. Another effect of the urban population pressure in Africa is the scarcity of firewood and charcoal as fuel for cooking. Around urban centres in the Sudano-Sahelian region, the savanna woodlands have been depleted up to a radius of 70 km around towns (Khartoum, Niamey and Bamako). One suggestion to combat deforestation in the marginal semi-arid areas in the tropics is the practice of agro-silviculture. On allowing farmland to return to fallow, fast-growing forest trees such as leguminous Cassia spp. and Leuceana glauca are planted. Then after a normal fallow period of five to seven years, the trees are harvested for firewood whilst the soil has become enriched for growing crops. This is a recommended environmentally-sound management practice for tropical farmland that ensures self-sustaining economic returns every few years. In the area of timber exploitation, developing countries must draw up concessions that prevent the export of timber as logs to industrialized countries. Forest contracts should encourage forest industries such as saw-milling and furniture factory in the country as well as ensure a forest rehabilitation programme for continuous exploitation. In this way the environmental effects of deforestation such as soil erosion, flood damage, loss of watershed, and economic sterility can be minimized.

6/ World Bank: Forestry. February 1978.

17. The development of water resources in Africa has been concentrated within the last two decades on construction of large dams across the main river drainage systems. In every case, the dams create large man-made lakes such as Lake Nasser from the Aswan High Dam, Lake Volta at Akosombo, Lake Kianji at New Bussa and Lake Kariba on the Zambezi for generating hydro-electric power. Environmental problems arise from the presence of the lakes and their network of shallow inlets as well as from irrigation canals connected to the lakes. The channels create new and expansive habitats for insect vectors causing water-borne diseases such as malaria, schistosomiasis, onchocerciasis and filariasis. Other water-borne diseases such as typhoid, cholera, amoebic dysentry, hook worm and round worms are due to contamination of the water by faecal matter and can be readily controlled by the introduction of sanitation and hygiene training in the lakeside settlements. Hence, the economic benefits derived from water resources development such as generation of electrical energy and irrigation of arid land for agricultural projects are marred by the proliferation of environmental health hazards that can even prevent the settlement of the newly developed area in some cases (cf. Lake Volta).

18. Africa is rich in minerals, amost of which are exploited by surface mining, as in the case of diamonds, bauxite, iron ore, tin, copper, uranium and gold. The economic returns of these non-renewable natural resources are good but the environmental problems created in the process of open-cast mining are serious because of lack of proper land management. Initially, the natural vegetation and the soil are lost as the land is cleared but worse still are the washed-out, mined-out tailings that form unsightly heaps in the area, the large ponds of dirty water and the permanent discoloration of streams and rivers in the mining area. An even greater environmental problem arises after mining activity has ceased, whether the land is rehabilitated or not, from soil pollution arising from accumulation of heavy minerals present, but not mined, at the site. For example, when copper is mined, the tailings accumulate lead, cadmium and manganese which are taken up by crops grown on the rehabilitated land, causing food poisoning with immediate or chronic effects on the people who live around the mining sites.

19. The question of energy conservation in Africa is very closely linked with deforestation because firewood and charcoal used as fuel for cooking, are still a major source of energy in the urban and rural areas. To combat deforestation in Africa, firewood and charcoal which are wood-based, non-renewable fuel sources should be replaced by non-conventional, renewable energy source such as solar energy and biogas. Africa is endowed with anything from six hours minimum sunlight in the rainy season to about 12 hours during the dry season, thus ensuring a fairly constant solar condition throughout the year for energy. Also, since Africa is still predominantly rural, the raw materials for biogas production (cow dung and farm refuse) are still abundant and the technological adaptation is not difficult. The only difficulty envisaged is that of changing the socio-cultural patterns of the indigenous African peoples with regard to their cooking habits developed over several generations. This change in lifestyles, may come naturally by the year 2000,

for as population pressure increases and deforestation worsens, the mass of the people will be compelled to use any form of energy left available to them.

20. As the standard of living and the level of income in African countries improve, more and more people are changing from the traditional use of fire-wood and charcoal as fuel to petroleum gas in cylinders and kerosene for cooking. Except for cooking habits, the pattern of energy use in developing countries is very similar to that in developed and highly industrialized countries. Electricity is used mainly in industry and in the domestic and commercial sectors for lighting, space cooling in the tropics and for small appliances (cleaners, music systems and kitchen equipment). The cost of crude oil and petroleum products is hitting everybody and developing as well as developed countries still rely heavily on petrol, diesel and kerosene (jet fuel) for road, rail and air transport. The present global trend in production and supply of fossil fuel oil demands an energy conservation policy for a change in consumption patterns and lifestyles. Gas-guzzling automobiles must evolve towards compact, fuel-saving cars and the human race must adjust its ecological amplitude to tolerate a bit more heat in summer and a little bit more cold in winter to save energy if it cannot improve on the insulation of living structures. Most of Africa is fortunate in its energy options with regard to climatic conditions.

21. The conservation of wildlife is one of the most important environmental concerns in African countries today as overexploitation is leading to the extinction of several threatened species of African big game - the rhinoceros, elephants and the pigmy hippopotamus, to name a few. Overexploitation results from the economic benefits derived in terms of foreign exchange, especially in the East African countries with an active tourist trade. European tourists will always come to Africa to see its big game in their natural habitats in the game parks. The tourists would also spend their money in buying wild animal products such as leather goods and furs, and trophies such as ivory, horn carvings and stuffed animals. Besides, there is the billion dollar export trade in live wild beasts to various zoos in the world, especially for rare animals and threatened species which fetch higher prices. If Africa should promote tourism, it must conserve and protect its wildlife and their natural habitats from poachers, from indigenous local population pressure and from undue cropping practices for food and meat products. The natural ecological processes in regulating animal numbers according to the environmental conditons prevailing must be allowed to work. The role of the Regional Commission in the conservation of Africa's wildlife must be to co-ordinate the scattered activities of various concerned organizations such as FAO, UNESCO, International Union for the Conservation of Nature and Natural Resources (IUCN), the World Wild-life Fund (WWF) and others, for a consistent strategy to promote government policies.

22. Much emphasis has been directed towards the conservation of natural resources on land (terrestrial, including freshwater resources) to the seeming neglect of marine and coastal resources in Africa. There is much concern about the rate of depletion of living marine resources such as fishes (tuna and sardines), shrimps and molluscs (oysters) in the continental shelf of the Gulf of Guinea. Over-fishing by foreign trawlers is rampant owing to lack of

adequate government supervision. A major environmental problem, besides depletion of the living fish resources, is marine pollution from off-shore oil drilling, but more so from normal shipping activities involving crude oil washings and deballasting. A certain amount of land-based pollution enters the African marine environment and coastal waters from urban sewage and municipal dumps, from mining tailings washed into streams and rivers and from agricultural and industrial wastes mentioned earlier. It is important that marine pollution be contained by legislation and law enforcement in Africa in the same way as for the other environmental problems discussed above.

Environmental rehabilitation

23. In the African situation, curative measures to restore ecological equilibrium to degraded lands, to restore soil fertility, to reafforest marginal lands with a view to combating desertification and to clear oil spills in the ocean and on the beaches may be far more costly than measures to prevent the occurrence of such environmental problems. Environmental rehabilitation programmes are more evident in the developed countries as indicated by legislative and technical measures directed towards cleaning up polluted rivers, pretreatment of industrial wastes and, more vividly, the clearing up of tar and dead marine animals from beaches after oil spills from shipping accidents at sea. The world, including developing countries, learns about such rehabilitation measures through the mass media - radio, television and newspapers. And many developing African countries still assign low priority to environmental rehabilitation programmes under the misconception that such problems are non-existent in their countries. They forget that deforestation arising from farming practices and firewood and charcoal procurement is inherent in rural Africa as a result of the traditional life-styles which over the centuries have become ingrained in the socio-cultural pattern.

24. In the African region today, the most serious environmental problem demanding rehabilitation measures is desertification. In its widest sense, the process of desertification is the gradual loss of productive land as the soil loses its capacity to support plant life. The soil becomes more and more like "desert sands", it loses its structure, colour and texture, its water-holding capacity and is easily blown about by the wind. In arid and semi-arid regions, the desertification process is evident within a mosaic of vegetation pattern with pockets of exhausted soil as desert sands interspersed with cultivated farmland or cattle rangeland. A similar mosaic pattern of derived savanna within closed forests occurs during deforestation in the humid tropics. As the process worsens, the pockets of degraded land spread and coalesce, resulting in a reversal of the pattern with pockets only being occupied by productive land. Gradually no productive land is left and the desertification process is completed.

25. Deforestation is the shadow of the desertification process as both are primarily caused by human activities. However, the occurrence of desertification in arid and semi-arid lands is also related to the climatic patterns of rainfall and temperature.

In the Sudano-Sahelian region, the pattern appears to be a number of years with adequate rainfall followed by a few years when rainfall is less than half the normal. When there is adequate rain, agricultural production and livestock increase far beyond the carrying capacity of the land during drought years. Hence, in the drought years, livestock die of starvation and famine is widespread as the productive capacity of the land decreases. The main contributory factor to desertification is high population pressure as the small nomadic pastural communit existing in balance with nature in arid lands changes its lifestyle to sedentary farmers when better climatic conditions prevail or boreholes provide groundwater for irrigation. Increased population pressure also leads to deforestation of the woodland vegetation around the growing settlements because of the search for firewood and charcoal. The exposed soil soon loses its nature, becomes degraded and is easily eroded away by wind and water.

26. In the marginal semi-humid savanna and forest regions in tropical Africa, the process of desertification comes in the wake of deforestation. If corrective measures fail to halt deforestation due to firewood fuel and shifting cultivation, then the resulting soil degradation and erosion would lead to desertification and irreversible loss of productive land. It is estimated that 50,000 to 60,000 sq. km. of agricultural land are lost annually to the creeping desert. 7/ Globally, about one third of the earth's surface, containing about one sixth of the world population, is threatened with desertification. Coupled with the estimated food requirements for the global population which will double by the year 2000, the prospects for the next century seem very gloomy indeed.

27. Other problem areas requiring environmental rehabilitation are marine pollution and natural disasters. Both problems have accidental and unpredictive elements in common as evidenced by oil spills during tanker accidents, drought in arid lands, flooding of large rivers, earthquakes, volcanoes and tropical storms and hurricanes. Hence, the cost of a rehabilitation programme for any of these disasters is generally far beyond the resources of most African Governments. And since preventive measures cannot be taken against disasters, African Governments would have to make contingency plans and support global organizations such as OXFAM, the World Food Programme and UNDRO that cater for such problems.

Current activities to combat environmental problems

28. The preceding section has been devoted to a review of the environmental dimensions of problems of development activities in Africa. The purpose of this action is to consider what is being done at present at the international, regional and national levels to combat the environmental problems identified in the African region.

7/ M.K. Tolba, Can desertification be stopped? Desertification Control, vol. 2, pp. 7-8. UNEP, Nairobi, December 1978.

29. Current activities at the international level to incorporate environmental dimension into development planning and projects are spear-headed by the United Nations Environment Programme (UNEP) assisted by several United Nations specialized agencies and bodies (FAO, WHO, WMO, ILO, UNESCO, UNCTAD, UNIDO, IAEA, etc.), by development financing institutions (World Bank, ADB, BADEA), by non-governmental organizations (IUCN and WWF) and by intergovernmental organizations EEC/ACP, OAU, ECOWAS, working in the region. Within the global framework of the Environment Programme and the catalytic effect of the Environment Fund, a selection of environmental activities being carried out by UNEP, in co-operation with the above-named organizations and others, are listed below:

(i) UNSO Action Plan to combat desertification in the 15 countries of the Sudano-Sahelian region; Green Belt and SOLAR projects (with ECA, FAO UNDP);

(ii) Regional Seas Programme on marine pollution and conservation of resources in the Mediterranean, West African and Red Sea regions (with ECA, UNESCO/IOC, United Nations Headquarters, FAO and ECOWAS);

(iii) Human Settlements - Dodoma - Planning of new capital of the United Republic of Tanzania; new building materials technology (with HABITAT, UNDP, and ECA);

(iv) Health for the people - Eradication of water-borne diseases in man-made lakes of large dams - Volta, Nasser; Primary Health Care for all by year 2000; integrated pest control; tropical diseases (with WHO, FAO and ECA);

(v) Tropical woodlands and forest ecosystems - Monitoring of deforestation in Benin, Togo and The United Republic of Cameroon; conservation of forests and forest industries management (with UNESCO/MAB, FAO, ECA and ECOWAS);

(vi) Water - Integrated rural water supply for the International Drinking Water Supply and Sanitation Decade; Rufiji River Basin development (United Republic of Tanzania) (with the World Bank, WHO, FAO, ECA and UNICEF);

(vii) Genetic resources - Microbiological resource centres for nitrogen fixation for fertilizers at Nairobi and IITA (Ibadan) and bio-technology for biogas at Cairo; survey of trypano-tolerant cattle breeds in Africa; crop genetic resources survey in Kenya, Benin and the United Republic of Tanzania; biosphere reserves for forest genetic resources (with UNESCO/MAB, FAO, the World Bank, UNDP and IUCN);

(viii) Wildlife and protected areas - Survey in 22 countries in West and Central Africa; World conservation strategy; Biosphere reserves; Conventions on threatened species; Wildlife conservation training in the United Republic of Tanzania, Nigeria and the United Republic of Cameroon (with IUCN/WWF, UNESCO/MAB, FAO and ECA); and

(ix) Education and training - African Youth Leaders Training Course in Conservation; Training Workshop for African Scientists and Administrators in Eco-Development; PACEET (Africa) activities in adult education, primary, secondary and university curricula development (with UNESCO, ILO, UNICEF and African Curriculum Organization - ACO).

30. In addition to the above-mentioned specific activities of the Environment Programme in the African region, UNEP is providing technical assistance to Governments through its Regional Office for Africa and to ECA in the areas of environmental management and institution building. UNEP has strengthened the environmental capabilities of ECA and other regional commissions by setting up Environmental Co-ordination Units whose functions are discussed later on. Another joint ECA/UNEP project has enabled ECA to assist 25 African Governments between 1975 to 1977 to establish or strengthen their national environmental machineries. A follow-up activity in June 1980 will be a Seminar/Workshop on Environmental Legislation for lawyers, planners and policy makers to create national environmental capability to infuse environmental principles into development planning for resource conservation and environmental protection.

31. The joint ECA/UNEP Seminar on Alternative Patterns of Development and Lifestyles in the African region (project FP/0404-78-05) held in March 1979 enabled Government experts to appraise the economic situation in the region at the end of the Second United Nations Development Decade. An Action Plan incorporating environmental principles for development, has been adopted 8/ for a self-sustaining and self-reliant development strategy for the region in the 1980 decade.

32. The assistance given by UNEP with its Environment Fund and by development financing organizations such as UNDP and the World Bank group to ECA is one aspect of the regional activities in Africa to combat environmental problems. Another aspect is seen in the Commission's programme of work and priorities, 1980-1981 9/ where the Environment Co-ordination Unit is responsible for co-ordinating environmental activities within the Commission as well as for implementing environmental projects, jointly with international organizations, within the African region and its subregional MULPOCs.

33. In summary, the Commission's work programme shows that environmental considerations are being taken into account in various project development activities relating to: agriculture and the African Food Plan; industries especially forest-based ones; science and technology capabilities; manpower training; human settlements design, policy and planning; natural resources development for water, energy and minerals; population activities; integrated rural development and social welfare, especially for women and children; and transport, communications and tourism.

8/ Conference of Ministers resolution 332(XIV), Development Strategy for Africa for the Third Development Decade - Annex A, Section II.6 (E/1979/50 - E/CN.14/725).

9/ Programme of Work and Priorities for 1980-1981. Fourteenth session/ fifth meeting of the Conference of Ministers, (E/CN.14/707/Rev.1).

34. Activities initiated at the national level to tackle environmental problems exist at various levels within African countries depending on their environmental capabilities and financial resources. However, most African Governments seek bilateral or multilateral aid from the developed world in order to combat pressing environmental concerns arising from lack of development or from imported pollutive industries. Examples of countries with very active environmental programmes are:

Kenya (wildlife, human settlements, desertification);

Ghana (water resources and health, industrial pollution);

Egypt (industrial and agricultural pollution, water resources);

Senegal (desertification, water resources, energy);and

Nigeria (human settlements, water resources, industrial pollution).

This list is not exhaustive as other African countries are either trying to establish an environmental machinery and develop human resources, planning an environmental input into their development strategy, or seeking financial support for implementing priority environmental projects.

C. INCORPORATION OF ENVIRONMENTAL ISSUES IN DEVELOPMENT ANALYSIS AND PLANNING - THE ROLE OF COST-BENEFIT ANALYSIS TECHNIQUES

35. One of the important questions in dealing with environmental problems in the development process is how to determine the costs and benefits of tackling or neglecting such problems. Most Governments, particularly of developing countries which have limited resources, have been worried about this issue and are anxious to find ways and means of dealing concretely with the issue.

36. It is in this context that the on-going work of UNEP on the evaluation of the case studies and cost-benefit analysis of development and environment problems submitted to it by some Governments is of great importance. In this connexion, costs are classified as:

(a) Implementation costs, i.e. capital costs, maintenance and operational costs necessary for the efficient working of the control measures adopted e.g. equipment for pollution emission control in a factory; and

(b) Other costs, viz. environmental costs resulting from the environmental damage caused, and social costs resulting from a reduced level of welfare due to damages caused to the environment. 10/

The benefits expected from the measures are defined as reduction of costs associated with environmental damages. They are usually monetary benefits resulting from reduced environmental damage costs and welfare benefits shown

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10/ UNEP/IG.15/2. Cost-benefit evaluation of environmental protection measures. First Intergovernmental Expert Group Meeting, Nairobi, 9 and 10 April 1979.

as improvement in the quality of life as a result of the restoration or preservation of the environment. The benefits tend to outweigh environmental and social costs.

37. Before cost-benefit analysis is undertaken, a quantifiable data base should be established on the basis of an environmental impact assessment of the project under consideration. Cost-benefit analysis shows a profile of costs and benefits, usually in monetary terms, of the short-term effects of a project. The main constraints of cost-benefit analysis are that it is based on current market prices. However, because of the risks and uncertainties associated with the development process and of the long-term effects of ecological liabilities, shadow prices for future social welfare costs and benefits, and a discount rate are used to compare present benefits (costs) with future costs (gains). Moreover, because of these uncertainties associated with future and long-term effects of ecological liabilities, considerable subjectivity and assumptions are involved on the part of the analyst and the resulting information, which has to be used with caution, can be used only as a guide in decision making. Cost-benefit analysis is not a decision criterion but one of the components of the decision-making process to assist Governments in framing environmental policies and measures.

38. Unfortunately, the case studies so far submitted to UNEP deal mainly with industrial pollution problems in the developed countries. There is hardly any case study from a developing country except Thailand, which deals with river pollution effluents from sugar mills. Similarly, most of the case studies proposed for future analysis by UNEP deal mainly with industrial pollution problems. However, the few that exist on developing countries are related to agro-based industries (Kenya, Bangladesh, Malaysia) and mining industries (Sri Lanka, Thailand, the Philippines) which can be applied to conditions in Africa.

39. In developing countries, where technological resources are just as scarce as capital resources especially for the implementation costs associated with pollution control, the emphasis in cost-benefit analysis is not on micro-economic projects but on those projects affecting whole subregions such as deforestation, desertification and river basin development. UNEP is therefore planning economic studies on the environmental impacts of macro-economic development projects. This will be a positive contribution by UNEP towards the aspirations and goals of developing countries for an integrated environment-development strategy for the next Development Decade.

40. To enable developing countries to undertake an assessment of environmental impacts of development projects, Governments must maintain certain norms, standards and regulations for environmental control measures and policies. In order to establish their own standards and codes of practice, African Governments must actively participate in international meetings dealing with conventions, protocols and regulations on environmental matters. For example, the Codex Alimentarius Commission (WHO and FAO) has established about 130 food

standards for pollutants and 900 limits for pesticide residues in the environment. 11/ ILO has set up guidelines for occupational safety and health, dust and noise control and permissible level of toxic substances for industry, all directed towards the improvement of the working environment. WHO so far has published several guidelines as criteria for chemical and physical agents such as lead, mercury, nitrogen compounds, cement and the sugar industry, etc., which would have harmful health effects.

41. Other studies have been initiated by United Nations organizations through the focal points in the former Environment Co-ordination Board whose responsibilities are now carried out by the Administrative Committee on Co-ordination which has shown concern about possible adverse environmental impacts resulting from members (agencies) activities, even though it was realized that many of the agencies' development activities are beneficial to the environment. The Ashford report referred to above examined the operational field projects implemented by United Nations organizations, which were generally financed by the World Bank group and by UNEP as preinvestment feasibility projects. The report categorized various development activities and their environmental impacts (both beneficial and adverse) and it also examined the steps taken by the organizations to identify and minimize the possible adverse impacts of an activity. It was found out that only UNDP and the World Bank carried out systematic environmental assessments of development projects for possible adverse effects. The report recommended that all United Nations organizations should carry out similar systematic studies at the planning, implementation and appraisal stage of a project, and that guidelines for assessing priority environmental areas should be produced for use by focal points as well as by the non-technical UNDP resident representatives at the country level where projects are implemented.

42. So far, operational guidelines for development activities are being prepared for six selected subareas relating mainly to agricultural and industrial case studies from Governments evaluated by UNEP, and which can be of immense use to developing countries with 'budding' industries:

(a) Hides and skins industries;

(b) Irrigation in arid and semi-arid areas;

(c) Watershed development;

(d) Pulp and paper industry;

(e) Pesticides used on industrial crops; and

(f) Coastal tourism.

11/ Ashford report, 1978. Environmental impact of the activities of the United Nations system.

These draft guidelines initiated by multilateral development financing corporations were reviewed at a UNEP/UNDP World Bank Group meeting held in Paris in September 1979. A draft Declaration of Principles 12/ was also prepared on the incorporation of environmental considerations into development policies, programmes and projects initiated by the agencies in questions. The draft Declaration of Principles was to be signed by the respective executive heads as a contribution of environmental policies and procedures relating to economic development towards the preparation for the new international development strategy.

43. There is one aspect of the development-environment problem which needs to be stressed here - the implications for development analysis and planning, including data collection and analysis. Environmental problems demand a new orientation in approaches to the determination of data needs for analysis and planning because the type of data required is outside the traditional and stereotyped system of statistics. Indeed, in order to grapple with the problems involved, it is necessary to mount a series of programmes for the development of appropriate indicators, a task that calls for strict collaboration with professional statisticians and various specialists in the physical and biological sciences in whose domain environmental problems normally fall. Similarly, a realistic approach to the problem of incorporating environmental issues in development analysis and planning demands a concentrated effort on project analysis and implementation. This is principally because environmental problems can best be handled at the project level. And as already discussed above, this implies a serious attempt to master cost-benefit analysis techniques.

D. CONCLUSIONS AND PROPOSED ACTION PLAN FOR AFRICA

44. In conclusion, regarding actions African Governments should take in order to promote environmentally sound socio-economic development in the region within the context of the Monrovia strategy, as pointed out in Conference of Ministers resolution 332(XIV), African Governments are committed to the preservation, protection and improvement of the environment inter alia, through various guiding principles and a plan of action adopted for a new development strategy to change the pattern of economic growth in the coming decade. To harmonize the environment-development process in Africa, an action plan on priority areas of environmental concerns within the region is urgently required. In the plan emphasis should be placed on preventive rather than on curative measures in order to minimize the economic costs of rehabilitation necessary to correct past mismanagement of resources, pollution damage and a growing deterioration in the quality of life in Africa.

12/ UNEP/IG.31/2. Declaration on Environmental Policies and Procedures relating to Economic Development. Paris, 12-14 September 1979.

45. An action plan to combat environmental problems in the African region should clearly define responsibilities (i) relating to what is to be done within African countries at the national level; (ii) specifying where multi-national action is required for transboundary problems; and finally (iii) indicating what international actions are necessary. Since all major environmental problems arise from activities within a country, the initiative for action must be at the national level. However, some environmental problems know no geopolitical boundaries (e.g. pollution of large rivers, and contagious diseases such as influenza, cholera, rinderpest), and hence while action is initiated at the national level, it is inevitable that joint action will have to be taken at the multinational, regional and even international level in view of the increasing interdependence of nations.

46. The priority areas of environmental concerns in the African region have been extensively discussed in this paper. However, in proposing an action plan at the national level, the following constraints will have to be taken into account: (i) lack of knowledge on prevailing environmental problems due to the ecological diversity and enormous size of the continent; (ii) scarcity of human, financial and other resources to tackle environmental problems; and (iii) the need for a continuous assessment of environmental problems in development planning as they are perpetual problems resulting from man's activities and unforeseen acts of nature.

47. In Africa today, the major areas of environmental concern requiring immediate action are as follows:

(a) Environmental sanitation, water supply and health. There is need for environmentally sound principles for waste disposal such as conversion of urban garbage into manure at refuse dumps using soil overlays, use of rural garbage for biogas production; recycling of municipal sewage for mineral fertilizers, and of old rags and clothes into paper; pre-treatment of industrial and agricultural chemical wastes to avoid water pollution; combating of water-borne diseases resulting from large dam projects; provision of drinking water and food (as a balanced diet) safe from toxic pollutants and contaminants in the soil and air.

(b) Deforestation and soil degradation. Preventive action must be taken to convince local farmers to allow for adequate fallow in shifting cultivation with the incorporation of agro-sylvicultural practices to cultivate low-lying swamps instead of uplands to avoid soil erosion. To solve the firewood problem, which is the main cause of deforestation near urban areas, wood-lots have to be established and alternative sources of energy as fuel, for cooking and heating, have to be obtained from biogas production, solar and wind sources.

(c) Desertification and drought. National programmes must emphasize re-afforestation with native trees as windbreaks, soil stabilization with indigenous grasses; exploitation of underground water resources for irrigation; maintenance of the carrying capacity of arid lands for cattle grazing and for human settlements; establishment of meteorological and hydrological stations for monitoring weather patterns and availability of moisture for agriculture, and enforcing strict land management practices in accordance with the Green belt and SOLAR concepts.

(d) Marine pollution and conservation of marine resources. Coastal countries must enforce laws to prevent pollution from passing ships and from industries located near the coast. For the conservation of marine resources, fishing agreements must be reviewed to ensure that mother ships of foreign trawling companies are based at ports (and not out at sea) so that all fish caught (especially with the aid of radar at night) in the economic zone, are landed and processed in port. This will prevent tax evasion whereby African countries no lose over 75 per cent f their marine resources.

(e) Human settlements. Existing settlements, towns and villages must be improved to provide adequate space allocation and ventilation in houses, proper layout of streets and facilities (electricity, water pipes, telephones, covered storm-drains, sewage), establishment of low-cost dwellings using local building materials to eradicate slums and creation of rural development projects with appropriate technology to ease and prevent urban population migration.

(f) Mines. Attention must be directed to the rehabilitation of open-cast mined-out sites and to the mine tailings dumped at such locations because of the accumulation of toxic minerals which were not mined in the soil and which contaminate food crops. Also the spread of water-borne diseases from discarded ponds and re-afforestation of the mined-out sits deserve special attention.

(g) Pollution control. Imported pollutive industries and engines (automobiles, electric generators, mills etc.) that would fail to pass pollution standards in the country of manufacture is another environmental hazard to African countries which may be unaware of the risks involved.

48. In dealing with the above priority environmental concerns at the national level, action will have to be concentrated at two fronts - anticipatory and preventive and reactive and curative. In both cases, the measures to be taken in terms of policies, institutions and programmes are very urgent. Any delay in dealing with past neglect or failure to prevent future environmental damage could be costly not only in terms of money but also in terms of health hazards and real resource loss. There are already doubts about the efficacy of anticipatory policies in attacking the fundamental forces underlying the continuing degradation of the environment. This is because the fundamental forces are set in the personal habits and cultural traditions of society and the institutional forces that serve them. It is in this context that the questions of alternative life-styles and alternative growth patterns compatible with the maintenance of a healthy environment have arisen. In this framework, national values and customs which determine the composition of goods and services to be produced and the technologies involved have a strategic role to play.

49. Some of the policies, institutions and programmes required for dealing with national environmental problems in the development process are summarized below:

(a) Policies. Environmental problems are rarely clearly defined as such in national development planning, hence the need to identify them in policy areas where they occur and to apply project analysis for assessment, particularly in the framework of techniques of cost-benefit analysis, assuming that the national capability to undertake such analysis exists. As a basis for realistic policy analysis and decision making, there is need for a concrete knowledge of the state of the environment, i.e. the range, size and seriousness of environmental problems at the national level. This should be followed by statistical activities and measurements devoted to the development of appropriate indicators for environmental problems as a basis for the collection, analysis and publication of environmental information.

(b) Institutions. It would be necessary to institute national environmental machineries as a central focus to co-ordinate the above-mentioned development activities undertaken by various ministries and departments to solve environmental problems. Such a central institution will have a national committee formed from nominees in government departments, various industries and the public and private sectors. The committee will supervise the implementation of government policy including rules and regulations regarding environmental problems and advise the government on any new measures required while avoiding duplication of effort and wastage of resources. The committee will also be responsible for the incorporation of environmental principles into the national development plans and programming activities and will work closely with national and regional scientific associations and all relevant international organizations concerned with environmental problems. Each country must also build up its national institutional capabilities within research laboratories and universities to monitor and assess environmental problems.

(c) Programming. In order to develop the national infrastructural framework to initiate, formulate and implement appropriate policies on the environment, programming exercises in environmental education and manpower training, and environmental legislation and law enforcement will be necessary. Environmental education programmes for the adult, out-of-school public should be mounted using all available media of communication, and formal education curricular materials at schools, colleges and universities should incorporate environmental concerns. To legislate against the deterioration of the environment, African Governments should develop pollution standards and norms for the protection and conservation of resources. A strong law-enforcement team would be necessary for the effective implementation of environmental laws and legislation. The financial resources for the above activities can be obtained from revenue from penalties for non-compliance with environmental rules and regulations, supplemented by levies on agricultural, industrial and other enterprises.

50. Although it has been stressed that actions for dealing with environmental problems will be mostly at the national level, because of the nature of such problems, African Governments will have to promote multinational, regional and

even international co-operation in solving some of the problems. In this connexion, reference is made to the work of ECA, its subregional organs, the MULPOCs, UNEP and the specialized agencies for the global dimensions of environmental problems.

51. At the international level, the action plan would deal with (i) the provision of environmental education materials and training facilities; (ii) technical assistance to Governments at their request to solve pressing national and transnational environmental problems; and (iii) co-operation in the compilation and analysis of environmental data for the collection and dissemination of information on the state of the environment. At this level, the action plan is addressed to the various international, governmental, non-governmental and United Nations bodies (especially UNEP) and specialized agencies (WHO, FAO, WMO, UNESCO) and also to the Governments of developed countries, all of which have been contributing their expertise and other capabilities in solving environmental problems in Africa. This action plan would draw their particular attention to the above priority areas for international co-operation with African Governments, but the effectiveness of any technical assistance will depend on the political will of member States to handle environmental problems at the national level.